NEWS RELEASE

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Remarks by

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
FIRST NATIONAL CONFERENCE ON THE PEACEFUL USES OF SPACE
TULSA, OKLAHOMA
MAY 26, 1961

Governor Edmondson, Friends:

No one could live in or be associated with Oklahoma for almost ten years, as have my wife and I and our two children, without realizing that this is a land of tremendous space and and boundless horizons; with the outlook of the pioneer; capable of projecting into the challenging New Frontier of Space the competence, the willingness to experiment, the restlessness, and the personal courage and drive of the Great Southwest. I know that through your great universities and colleges, through the efforts of your leaders in every field, and through such activities as the Frontiers of Science Foundation of Oklahoma and this First National Conference on the Peaceful Uses of Space, you are determined to build here a modern scientific innovative culture that will furnish leaders for the space age in the vigorous tradition you have always maintained. Our national space effort needs these qualities, and it needs Oklahoma and the Southwest.

Fresh from my intimate experience with the ferment of the modern Oklahoma frontier, I have had no difficulty in feeling at home on the space frontier -- or indeed in President Kennedy's "new frontier." It was only necessary to change the habit of looking forward to the habit of looking outward.

Three and a half years ago, a short time even in the history of a new state like Oklahoma, the Russians were clearly ahead of us in space. They had launched the first manmade

earth satellite -- Sputnik I. Since then they have sent twelve vehicles into earth orbits, including the spaceship that carried Cosmonaut Gagarin around the globe. Although only one Soviet satellite is still in orbit, it is important to keep in mind that five of them weighed in the neighborhood of ten thousand pounds and that three of these large vehicles have been recovered from earth orbits.

In this same period, the United States has mounted a determined, major effort in the field of space exploration. We have drawn together in the National Aeronautics and Space Administration more than seven laboratories and space-flight research centers. The United States has placed in orbit 39 satellites of which 22 are still circling the world, with nine still transmitting signals and valuable scientific information about our space environment. And just two weeks ago, openly, before the eyes of the world, we conducted the first Project Mercury man-carrying suborbital flight. You all know that Alan Shepard was the Astronaut.

During the period since Sputnik I, we have evolved the technology that made this giant stride possible. We have also drawn heavily on the bank of scientific knowledge accumulated over many years by means of telescopic observation of the phenomena of the universe, filtered through the veil of the earth's atmosphere. On this scientific and technological foundation, we have developed means of designing spacecraft and of rocketing them into space packed with electronic equipment to isolate, measure, and observe specific phenomena. Data gathered by our satellites and probes have been radioed to earth. This enormous flow of information is being analyzed continuously by the most modern computer systems, and we are distributing the results to scientists in every nation. Thus we have achieved a position of open science, openly arrived at, by spreading these new examples of the puzzles and problems which every great scientific advance generates, to the largest possible number of able minds for interpretation and solution.

As an example of how this system works, on March 11, 1960, Pioneer V was launched by a Thor-Able rocket to gather scientific data from deep space and to test communications over interplanetary distances. This deep-space probe weighed 94 pounds and contained two radio transmitters and receivers. In it were instruments to measure radiation streaming from the sun, the spatial distribution of energetic particles and medium-energy electrons and protons, the number and density of meteoric dust particles striking the probe, and the strength of magnetic fields.

We were able to communicate with Pioneer V for a distance of 22 million miles and through it confirmed the existence of an electrical ring current circling the earth at an altitude of 40,000 miles, the existence of which had been speculated on by geophysicists for more than 50 years. Pioneer V also measured an intense zone of disturbed magnetic fields at distances of 40,000 to 60,000 miles from the earth, revealed that the boundary of the earth's magnetic field is twice as far from earth as had been previously supposed, and reported the first direct observation of pure cosmic rays at altitudes completely free of the earth's atmosphere. This observation was made three million miles in space.

I could list many other achievements in this three and a half year period, such as the discovery of the Great Radiation Belts, now named the Van Allen Belts for Dr. James Van Allen of the State University of Iowa, one of the eminent scientists working with the Space Administration. I could mention that our first weather satellite, Tiros I, completed more than 1,300 orbits of the earth and transmitted more than 22,000 pictures before we lost communication with it. I could go on to mention Echo I, NASA's brightly twinkling, earth-orbiting balloon which has been seen by millions and which has proved the feasibility of using satellites to reflect radio and other electronic signals. But I think I have made the point that the U.S. space effort has progressed in the three and a half years since man fired into orbit the first artificial earth satellite.

In so short a time, while carrying out much of the activity I have outlined, the work force of the National Aeronautics and Space Administration grew from 7,966 at the outset to 18,000 now. Our annual expenditure of funds rose from $145,490,000, during Fiscal Year 1959, our first year of operation, to what we estimate will be about $760,000,000 when Fiscal Year 1961 ends this June 30.

I believe it is fair to say that during this period the United States achieved first position in space, science, and technology and merited the confidence of the world scientific community. But there was one major field in which we did not make the necessary effort to achieve first position. This, unfortunately, was the area of building the large, high-thrust rocket boosters required to lift heavy payloads into space and to achieve sustained manned space flight. The U.S.S.R. did make the necessary effort and has reaped the benefit in world-wide acclaim.

So much for the past three and a half years. My own entry into this highly complex new dimension came three and a half months ago, when President Kennedy sent a message which I received while attending an Oklahoma City luncheon in honor of Senator Kerr. I can only surmise what went on in past years, but I know personally the intensity of work over the past 14 weeks.

There was the driving demand by the President and the Vice President that every facet of the requirements to recover our lost position be examined and evaluated.

There was the penetrating analysis of our past weaknesses by the Vice President, based on his experience during his two years' service as Chairman of the Senate Committee on Aeronautical and Space Sciences, with the follow-up of Senator Kerr, who succeeded him as Chairman of that committee.

There were the incisive and meaningful sessions with the Secretary of Defense and the Chairman of the Atomic Energy Commission to bring the diverse elements into harmony in the form of a national space program.

There were the long and detailed presentations to the Director of the Budget so that he might test the validity of our conclusions and assimilate the facts that would permit the President to weigh the requirements for the space program against the other urgent requirements of defense and national interest.

There was the decision of the President that the key to retrieving our position lay in determining that we could no longer proceed with the Mercury one-man spaceship as if it were to be the end of our program, but that we must -- even in a tight budget situation -- present to Congress the urgent necessity for committing ourselves to the giant boosters required to power the larger craft needed to accommodate crews of several men on long voyages of deep space, lunar, and planetary exploration.

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Funds were increased to speed up the Saturn C-2 booster and the large single-chamber 1.5-million-pound-thrust F-1 engine which will be one of the basic building blocks for Nova, the biggest rocket we have yet programmed. That is, to say, we shall use the F-1 rocket as our basic building block unless the new decision of the President, announced

yesterday -- that we will parallel development of this liquid-fuel rocket with a solid-fueled rocket -- produces a better and more powerful engine using some type of solid propellant.

Thus, the first major decision of the new Administration in the field of space was to step up the big-booster program to provide lift for larger and more advanced spacecraft.

The intensity of the effort pervading the past three and a half months did not end for me with President Kennedy's decision. At the same time that we were presenting the new program to the Senate and the House committees, the National Aeronautics and Space Council was being reorganized and the leadership of its Chairman, Vice President Johnson, was coming increasingly into play. The President asked the hard questions. The Vice President demanded the work to provide the answers. Those of us charged with getting the facts could see little difference between night and day, day in and day out, weekends and holidays.

We did manage to do the work. Based upon it, the President made his decision, and yesterday he announced major new goals for the Nation and new programs to achieve them.

The FY 1962 authorization request for the National Aeronautics and Space Administration is now increased to $1,784,300,000 or by 61 percent. The Space Agency expenditures for 1962 are now estimated at $1,380,000,000 or an increase of 43 percent.

The first augmentation of the Space Program by President Kennedy in March was primarily for the purpose of speeding up the booster and propulsion components whose development must precede an expanded program of manned and unmanned exploration of space. Further increases in this area, aggregating some $144.5 million, are included in the requests made by the President yesterday. Included is the initiation of a Nova vehicle of very large thrust, with sufficient power to land men on the moon and return them to earth. The increased request also provides an additional $130.5 million for Apollo, which will lead both to a three-manned earth orbiting laboratory and a manned lunar landing spacecraft. $66 million is requested for an accelerated effort in research and exploration of the environment around the earth, around the moon, and in the space between. Funds are provided for a study of the problems of return to earth from flights around the moon at reentry speeds up to 25,000 miles per hour which will generate extreme heat.

Thorough studies of radiation problems will be conducted including an analysis of solar activity over the past 50 years in order to predict, if possible, the periods of extreme radiation which man must avoid.

In President Kennedy's new request, there is an item of $50 million to expedite the development of solar cells, transistors, and other components and to demonstrate Trans-Atlantic television, as well as to bring into being the kind of satellite communications system needed to meet governmental as well as commercial requirements.

In the area of meteorological satellites, there is an increase of $22 million to expand the Tiros flight program, and, in addition, the President has requested $53 million for the Department of Commerce to enable the Weather Bureau to proceed without delay toward the development of a world-wide meteorological satellite system based on the Nimbus satellite now under development by NASA as a follow-on to the Tiros series.

In connection with NASA's program of speeded-up research and development of liquid propellant engines, an additional $15 million is provided to accelerate the 1.5 million pound thrust F-1 engine program, and $58 million is provided for long lead-time propulsion-development facilities such as static test stands for single and clustered engines; facilities for testing booster stages powered with clustered engines, and design of new launch facilities for the much larger flight vehicles to come in support of the manned lunar effort. The largest booster vehicle which is funded in this program is the Nova. $48.5 million is provided to start work on a liquid-fueled Nova flight vehicle.

The Department of Defense through its Minuteman and Polaris developments has great capability in the field of large solid-propellant rockets. Therefore, solid-propellant booster stages for the Nova vehicle will be developed by the Department of Defense in parallel with NASA's liquid-fueled stages. The Department of Defense budget will include $62 million to begin work in fiscal year 1962. This means that both of the liquid- and solid-propellant technologies will be driven forward at the rapid rate needed to assure the earliest availability of a Nova vehicle. As soon as the technical promise of each approach can be adequately assessed, one will be selected for final development and utilization in the manned space program.

Included in the requests is $23 million additional for the ROVER program for NASA's share in the cooperative NASA-AEC project looking toward a nuclear rocket engine. This includes $15 million for engine test facilities which should be started now in order to achieve the earliest feasible flight date.

From the above it is clear that the President's requests, taken as a whole, establish a pattern of effort that adds up to a vigorous, well-rounded national space program. There is wide participation by many departments and agencies.

This program in order to be successful, will require a sustained and highly paced national effort over a number of years. The President's action today not only steps up the program for the first year but also contemplates an increased tempo for future years.

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To provide you with perspective on the dimensions and stage ratings of the Nova vehicle that will be used to land the Apollo spacecraft on the moon and return it to earth, -- listen to these figures:

The overall height of Nova will be some 360 feet -- 60 feet taller than a football field is long.

The diameter of the first stage will be some 50 feet, and of the upper stages some 25 feet.

In one version the first stage will consist of eight clustered F-1 engines, each developing a thrust of 1.5 million pounds, using conventional rocket fuel. In cluster, the engines will produce a total thrust of about 12 million pounds.

This version also calls for second and third stages fueled with liquid hydrogen and liquid oxygen.

The Apollo spacecraft will carry its own propulsion system, retrorockets for soft lunar landing and other rockets for take-off from the surface of the moon and return to the earth. Apollo will weigh about 150,000 pounds.

Since the early days of World War II, the American people have faced many crises and have had the courage to make the hard decisions. The war effort was mounted and our arms were victorious. In the postwar world our deepest hope and desire

was that the people of all lands would share basic individual fulfillment in peace, freedom, justice, and continuing progress. We were confronted, instead, with the cruel reality of a powerful despotism, bent on burying us along with the basic tenets upon which our society rests and from which it draws its strength.

We Americans are a pragmatic people and we have always adopted new measures to meet new conditions. In the post-war period major milestones were passed with the adoption of the Marshall Plan, of the North Atlantic Treaty Organization with its military assistance program, support of the United Nations' action in Korea, the landing of troops in Lebanon, the Berlin airlift, and others that you can recall.

Now we are faced with another national requirement that will commit us for many years to a major undertaking in which second best has proved not good enough. All Oklahomans can be proud that at this First National Conference on the Peaceful Uses of Space the position of the United States in the competition for scientific and technological supremacy is presented clearly at a time when the President is calling for the support of the Nation.

In conclusion, let me make it clear that all of the effects of the national space program will not be confined to outer space itself. These effects will go beyond the impression they make in the minds of men around the world. You as a citizen, as a worker, as a parent, as a patient in a hospital, will feel them in your daily life. Already our push into space has produced a ceramic that is made into pots and pans that can be moved from the coldest freezer into the hotest flame without damage. Our study of foods best suited for space flight will lead to improved nutrition for the earthbound. Space research has created new materials, metals, alloys, fabrics, compounds, which already have gone into commercial production. From our work in space vacuum and extreme temperatures have come new durable, unbreakable plastics that will have a wide variety of uses, such as superior plumbing and new types of glass adapted for windows that will filter intense light. Our scientists have devised minute instruments called sensors to gauge an astronaut's physical responses in space, to measure his heartbeat, brain waves, blood pressure, and breathing rate. These same devices could be attached to a hospital patient so that he could be watched by remote control. In the future every patient's condition could be recorded continuously and automatically at the desk of a head nurse.

More than 3,200 space-related products have already been developed. These come from the 5,000 companies and research outfits now engaged in missile and space work. From this new industry will emerge new jobs that will help take up the slack of unemployment.

Those of us who are working in the national space program are convinced that a large part of our future as a nation is at stake. We appreciate the support of those of you who have come to this conference to apply your minds to the space problem, to understand its implications, and to make your own contributions to it.

Thank you very much.

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